

**THE PRACTICE OF ENGINEERING
FIELD WORK. WATERWORKS: OR,
THE DISTRIBUTION OF WATER ON
TOWNS UNDER THE CONSTANT AND
INTERMITTENT SYSTEMS; VOL. II**

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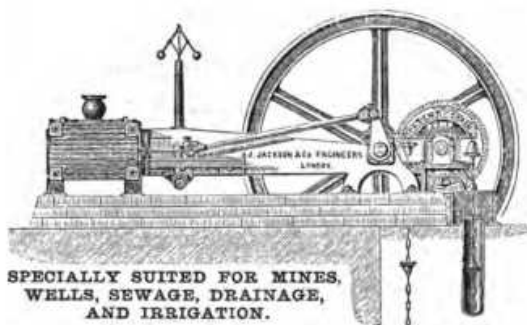
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W. DAVIS HASKOLL

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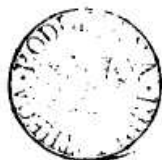
BY
W. DAVIS HASKOLL,

CIVIL ENGINEER,

AUTHOR OF

"RAILWAY CONSTRUCTION," 4 Vols., £5 6s.; and "ENGINEERING FIELD WORK," First Volume, 20s.

VOL. II.



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PREFACE.

THE "Practice of Engineering Field-Work" was so kindly and favourably reviewed by the Press, and so well received by the Profession, that it is only with considerable hesitation we venture to add a second volume, now that a large first edition has been exhausted and a second one called for. More especially to the *Athenæum*, the *Builder*, and the *Architects' and Civil Engineers' Journal*, the author begs earnestly to offer his most grateful thanks.

Very great changes, however, have occurred in the practice of Civil Engineering since the work was first issued, and but few of us probably thought only a few years since that such very great alterations could take place in the calls on our time and labours; we had then almost more than enough, but there are now much too few for every grade in the profession. We are, nevertheless, very far from thinking that this in any way justifies the gloomy feelings which prevail with many, and which we must consider as unworthy of the Engineer; we are merely passing through an ordeal, similar to those we have witnessed before, though somewhat more severe than usual. Let us hope that we shall benefit by it; that it will chasten and purify.

A warning has long since been given, and for a long time it was loud enough to caution even the deaf; and yet none appear to have heard it in time. When the destroying storm came, it utterly swept away many of the innocent, but it has only just swamped for a moment the great guilty ones; they, *phœnix like*, will rise again; no sympathetic fears need to be entertained on their account. Upwards of twelve months since, as near as we can remember, a long and most able and truthful letter appeared in the valuable columns of "Engineering" on railway matters, and on the manner railway schemes were brought to bear, and in which they were carried on. Good, honest, and truthful advice was therein given, but like many such letters, it passed unheeded.

For a long time past it has been well known amongst working, or assistant, or resident engineers, or whatsoever name they may be called by, that on very many railway schemes, their position,

consistently with a sense of honour, was untenable, not to say detestable; very often indeed held at the pleasure merely of a company's *eminent contractor*, who either had everything his own way and to his own profit, whatever might be the result to the company, or who did not fail to put that pleasure in force; the advice given in the shape of a practical hint was simply, 'Look on calmly at all these transactions; take your salary and be silent; do not disturb the harmony between me and the Board; although you are considered a gentleman, a member of a profession of high standing, and in the opinion of shareholders the honest guardian of their interests.' This is said without affecting any special sympathy even for the unprecedented sufferings which shareholders have lately endured, for we all know but too well that it is quite sufficient at any time to raise a warning voice in protection of their interests to be then and there crushed without one of them stretching forth a finger to prevent it. This is almost proverbial amongst professional men with any long experience in the actual labour of constructing works; it is almost equally well known that if you will but swim silently in the dirty current you will be a successful winner. At home or abroad, it is the same thing in respect of a very great number of railway undertakings.

It was at the very time, even to a month, and for some time after, when the last great financial and railway storm broke out, that the following occurrence took place, not in a comparatively unknown part of the world, but on a railway constructing only a few miles from London: About 600 yards of footings in a tunnel were entirely left out of the work, although they were allowed for in the monthly certificates, and measures were taken to silence the inspector; the level of rails was raised about two feet to conceal the "job" from the inspecting officer when the time should come for opening the line. In many places, more particularly where the ground was soft, the embankments sank very considerably below their proper level; to avoid the work of raising the rails and of ballasting according to contract, no sooner were the proper levels given by the engineer, and his back turned, than some one came after him, of course not the contractor, and had every one of the level pegs driven down to suit his own convenience. In consequence of boggy ground many of the embankments had settled down and slipped very considerably, and the proper centres for the rails were "nowhere;" when the engineer commenced setting out the centres for the curves of the permanent way, he was informed that it was quite unnecessary, that he was giving himself needless trouble, and that the plate-layers were quite capable of setting out the curves, and accord-

ingly so the work was done; what those curves are like may be ascertained some of these days with unpleasant consequences. So utterly disgusted was the gentleman who had to do the work, that he threw up his engagement, *at a time* when the most able men were looking for employment in every direction and in vain. Had such things occurred in an out-of-the-way place, in Turkey for instance, we should have thought less of the circumstance; but this was in one of the home counties. We believe, however, that this is by no means uncommon in railway works; and the result of this, that, and the other cheating, deceit, and imposition is the present state of railway collapse, and of public confidence in engineering undertakings generally, but certainly more particularly railways.

We do not by any means write these words with feelings of vain regret; on the contrary, we say the sooner we pluck ourselves out of anything so useless as mourning and gloom, the better for ourselves and the many who are waiting for railway engineers to awaken to something beside railways, which for a time are doomed, at least until great changes take place. We believe that there are still many paying railway lines to be constructed at home, if the localities are sufficiently studied, and suitable curves and gradients adopted; but they must be cheap, and cheap lines do not suit contractors, and for some time it has been usual not to inquire "who is the engineer?" nor "who is the chairman?" but "who is your contractor?" For a long time past this has been the great puff to railway schemes in the opinion of the public; they forget that your *eminent contractor* requires his eminent prices, and conditions, *sub rosa*, or otherwise.

These and many other similar conditions relating to the railway interests, have led us to submit with all humility to many of our professional brethren whether it is not possible to open up something like a new field on the subject of irrigation in connection with sewage; we use the expression 'humility' in all earnestness, because it may be considered, perhaps with justice, that we have no right to make suggestions to those who know at least as much as ourselves. But, in these strange times we venture to believe that it behoves all of us to speak plainly, so that we speak honestly.

If it were possible to imagine the existence and reality of the "Philosopher's Stone," we could almost think it must lay in some form of the practice of the engineer, when he is making roads and railways, docks and harbours, canals, irrigations, and water-works, and reducing the pain of animal labour by the introduction of the power of machinery; it has been said that to some extent many of these works have been overdone, and railways are